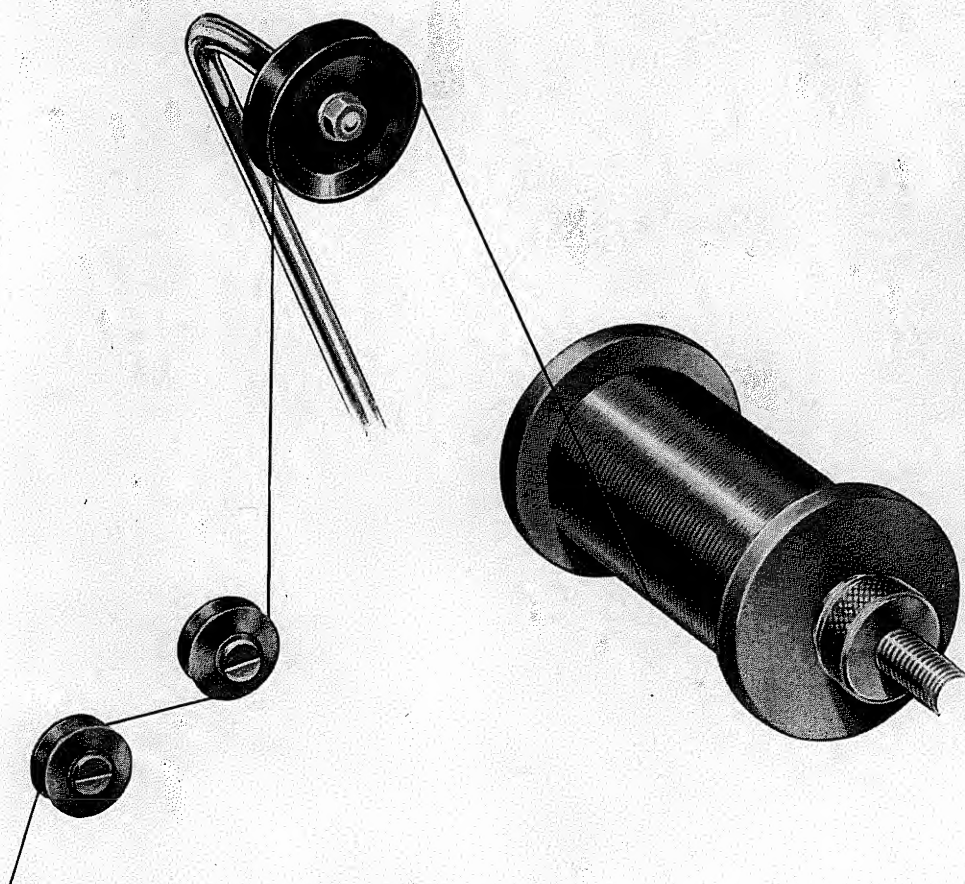




"DOUGLAS"
REEL CARRIERS



INSTALLATION • OPERATION • MAINTENANCE

AND PARTS LIST



“DOUGLAS”

INSTRUCTIONS FOR ORDERING SPARE PARTS.

WHEN ordering spare parts the following suggestions, if observed, will save unnecessary delays caused by correspondence arising from inadequate descriptions.

1. The type of the Reel Carrier should always be quoted on the order, e.g. “DOUGLAS” *Standard* Reel Carrier etc., and the part numbers and descriptions of the parts required listed ; these are shown on the plates.
2. If the desired part is not shown in the illustrations or indicated on the parts list, a complete description must be given, and where possible a pattern or sketch should be sent.

When improvements are made in the design of any type of Reel Carrier and the parts are interchangeable, the latest type of part will always be supplied, unless the order states that the parts must be the same as already fitted. In this case the date of purchase and source of supply should be given.

The Company retain the right to alter any design without notification, and guarantee against faulty workmanship only those parts manufactured by themselves.

Overseas users of “DOUGLAS” Coil Winding Machines should address their enquiries to the Company’s Agents in their country. Users in the United Kingdom should write direct to the address below.

THE AUTOMATIC COIL WINDER & ELECTRICAL EQUIPMENT CO. LTD.

WINDER HOUSE, DOUGLAS STREET, LONDON, S.W.1

Telephone : Victoria 3404 (8 lines).

Telegrams : AUTOWINDA, SOWEST, LONDON

Contractors to the ADMIRALTY, WAR OFFICE,
AIR MINISTRY, POST OFFICE, MINISTRY OF
SUPPLY, CROWN AGENTS for the COLONIES,
and ELECTRICAL and TELEPHONE MANUFACTURERS throughout the World.

"D O U G L A S"

R E E L

C A R R I E R S



MANUAL OF INSTALLATION, OPERATION AND MAINTENANCE

THIS instruction and spare parts manual is
intended to cover all types of "DOUGLAS"
Reel Carriers.

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THE "DOUGLAS"



REEL CARRIERS

"DOUGLAS" STANDARD REEL CARRIER

The "DOUGLAS" Standard Reel Carrier illustrated on Plate No. 1 is supplied as an accessory with many of the bench type "DOUGLAS" Coil Winding Machines. It may, however, be purchased as a complete assembly as illustrated, or Reel Carrier or Stand may be purchased separately.

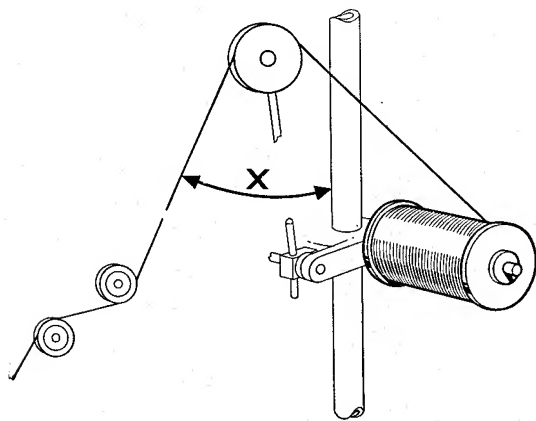
Wires from 47 s.w.g. (0.002" — 0.05 mm.) diameter to 28 s.w.g. (0.0148" — 0.38 mm.) diameter can be de-reeled when coils of round, square or rectangular section have to be wound, providing the following two points are carefully observed:—

- Rectangular coil section must have sides within the ratio of 2 to 1.
- The Wire Supply Reel should be in accordance with the British Standards Institution Specification, No. 1489, Table 2 (an extract is reproduced on Page 8). The reason for this is that Reels having an excessive gross weight cannot be adequately controlled.

When multiple coil winding has to be carried out, up to four "DOUGLAS" Standard Reel Carriers can be mounted on one Stand.

POSITIONING THE REEL CARRIER ON THE BENCH

The "DOUGLAS" Standard Reel Carrier assembly should be secured to the bench at the back of the Machine so that the angle "x" shown on the accompanying sketch is between 60°—80° and the Pulley, item 4, in the centre of the total traverse width. The Reel Carrier may be positioned on the tube by loosening the Clamping Screw at the back of the Reel Carrier Frame; it should be arranged as near to the top of the tube as practicable.



SETTING THE TENSION

The Wire Supply Reel must first be placed on the Main Spindle, Item 5, so that the wire comes from the top of the Reel when unwound; the Loose Cone, Item 6, is then replaced on the spindle and the Quick Release Nut, Item 7, is pushed along the spindle up to the Loose Cone and tightened, thus clamping the Supply Reel.

The wire is then drawn from the Reel and passed over the Pulley, Item 45 (the Pulley Arm, Item 4, is held in a clamping block, Item 10, which may be adjusted to bring the Pulley approximately opposite the centre of the Reel). The tension may now be adjusted and adjustment will be simplified if the following instructions are noted:—

The Pulley Arm, Item 4, when pulled down actuates a Cam, Item 20, which releases the Bottom Brake, Item 23, from the Drum, Item 27, which controls the over-run of the Reel. The Spring, Item 25, returns the Pulley Arm to its neutral position and is adjusted according to the gauge of wire being de-reeled.

The Upper Brake Spring, Item 29, is adjusted by means of the Adjusting Screw, Item 39, and when applied this gives the initial brake tension. Hence the procedure of adjusting the tension for a particular gauge of wire is thus:—all the tension on the Bottom Brake Shoe should be reduced so that it falls away from the Drum. A weight equivalent to the wire being de-reeled, see Table, Page 9, is hung on the end of the wire and tension applied to the Upper Brake Spring by means of the Adjusting Screw, and to the return spring for the pulley arm by means of the Adjusting Stud, Item 26. When these are correctly set the weight should fall gradually. The Bottom Brake Shoe is then brought up until it just touches the Drum; this will set the correct over-run for the wire and winding may be commenced.

MAINTAINING THE REEL CARRIER

It is important that the Main Spindle, Item 5, should rotate very freely and from time to time this must be dismantled, and the Ball Race, Item 13, cleaned and re-lubricated with a fine grade oil. This instruction applies also to the Pulley, Item 45, which should be examined for wear, as this may damage the covering of the wire.

Care should be taken to see that the Upper and Lower Brake Leathers are kept free from dust, dirt and oil. If dust or dirt are allowed to collect on these parts erratic tension will result and rapid wear of the drum will take place.

"DOUGLAS"

R E E L

C A R R I E R S

"DOUGLAS" UNIVERSAL REEL CARRIER

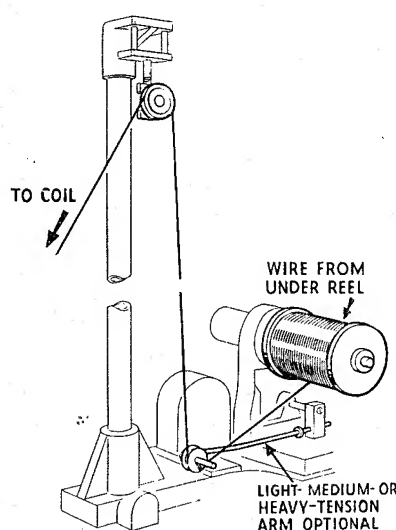
The "DOUGLAS" Universal Reel Carrier as illustrated on Plate No. 2 is especially useful when irregular-shape coils have to be wound. Wires from 50 s.w.g. (0.001"—0.025 mm.) to 21 s.w.g. (0.032"—0.8 mm.) can be de-reeled, but it must be borne in mind that the maximum diameter of Reel which can be used is 4" (101 mm.). The reason for this limited diameter of reel is that if Reels having too large a gross weight are employed, the tension will vary considerably during the use of the wire on the Reel.

The Reel Carrier is complete with three Wire Guide Arms, namely, Light Tension Arm Assembly, Item 56, Medium Tension Arm Assembly, Item 55 and Heavy Tension Arm Assembly, Item 53. The light arm should be used for wires from 50 s.w.g. (0.001"—0.25 mm.) to 48 s.w.g. (0.0016"—0.04 mm.); the Medium arm for wires from 47 s.w.g. (0.002"—0.05 mm.) to 33 s.w.g. (0.010"—0.25 mm.) and Heavy arm for wires from 32 s.w.g. (0.0108"—0.27 mm.) to 21 s.w.g. (0.032"—0.81 mm.). When the Heavy Tension Arm is being used the Spring, Item 60, is adjusted between the Arm and the Spindle, Item 59.

The Reset Spring, Item 38, contained inside the Cover, Item 58, is adjustable by means of the Hand Wheel Assembly, Item 27, and is set in accordance with the chart shown on Page 11. It must be borne in mind that the figures given on this chart are not intended to be taken as exact and are only an indication of the approximate position to which the indicator should be set. Variations will, of course, occur, due to the differences in tensile strengths of wire and weights of reels employed. The figures must, of course, be increased where wires other than copper are being wound.

The Slider Pulley, Item 8, mounted on the Guide Wires, Item 70, is attached to the Column Spring, Item 27, and is intended to act both as an over-run device and a shock absorber. The two Slider Stops, Item 68, should be set to allow the Slider to move between them within reasonable limits. For instance, if a round coil is being wound the distance between the Stops should be quite small, whilst if a coil of irregular section is being wound, with a large ratio difference between the length of the sides, the Stops should be set far apart. It is an advantage to use the Slider Pulley as near to the top of the column as possible.

The method of threading the wire over the Pulley on the Wire Guide Arm and the Slider Pulley is shown in the sketch below.



POSITIONING THE REEL CARRIER

When setting the Reel Carrier up on the bench it should be borne in mind that the column end of the casting should be close to the Machine.

MAINTAINING THE REEL CARRIER

Care should be taken to see that the Brake Pad which comes into contact with the Drum on the main Reel-Carrying Spindle is kept free from dirt, dust and oil. If dirt and dust are allowed to collect on this pad erratic tension will be obtained and rapid wear of the Drum will take place. The vertical wires should be kept lubricated with a fine grade oil and the Small Pulleys on the arms should also have their Spindles oiled at frequent intervals.

The Slider Pulley, Item 8, must be examined from time to time to ensure that it has not suffered damage, as this will affect the covering on the wire. This also applies to the Pulleys on the Light, Medium and Heavy Tension Arms.

"DOUGLAS"

GENERAL PURPOSE REEL CARRIER

The "DOUGLAS" General Purpose Reel Carrier, illustrated on Plate No. 3, is similar to that fitted to the "DOUGLAS" Large Multiple-Coil Winding Machine, and can be supplied either as a right or left hand Reel Carrier, i.e. with the Supply-Reel Spindle on the left or right hand side of the stand tube.

The design of this Reel Carrier has been greatly improved since the early prototype and now has four methods of applying tension, hence wires from 47 s.w.g. (0.002" — 0.05 mm.) to 18 s.w.g. (0.048" — 1.22 mm.) can be de-reeled when coils of round, square or rectangular section have to be wound. Care, however, should be taken to see that the Supply Reel is in accordance with the British Standards Institution Specification No. 1489, Table 3, included on Page 8, since Reels having an excessive gross weight cannot be adequately controlled.

The Reel Carriers can be purchased as a complete assembly on a tube similar to that for the "DOUGLAS" Standard Reel Carrier (shown on Plate No. 1).

POSITIONING THE REEL CARRIER ON THE BENCH

The "DOUGLAS" General Purpose Reel Carrier assembly should be secured to the bench at the back of the Machine so that the angle "x" shown on sketch, Page 4, is approximately between 60°—80°, and the Pulley, Item 10, in the centre of the total traverse width. The Reel Carrier may be positioned on the tube by loosening the Cotter Pin, Item 39, and should be arranged as near to the top as possible, as this gives the best winding results.

ADJUSTING THE TENSION

The Wire Supply Reel is first loaded on the Spindle with wire coming from the top of the Reel when unwound; this is to ensure that the Quick Release Nut, Item 41, does not become loose during winding. From the Supply Reel the wire is drawn under the Pulley on the Spindle, Item 40, and over the top of the Pulley on the Arm, Item 5.

Under normal winding conditions it is only necessary to change the Light and Heavy Extension Springs, Item 19 and 20, according to the gauge of wire being de-reeled. A Tension Chart and Tension Brake Table are shown on Pages 9 & 10, the latter being only to serve as a guide. Therefore,

if the following example is noted the various tension adjustments will be readily understood.

Assuming 46 s.w.g. (0.0024" — 0.06 mm.) is to be de-reeled the Hand Wheel, Item 62, is turned until the Spring Barrel and Arm Assembly, Items 22 and 23, leave the Brake Lever, Item 48, i.e. with the Wire Tension Indicator, Item 69 or 70 turned past zero. The Light Tension Spring, Item 19, is assembled on the Arm and if used in conjunction with the Spring, Item 34, the required tension can be applied.

To adjust the tension a "Tensometer," if available, is used, between the wire from the Pulley, Item 10, and the Wire Guide Arms on the Paper Inserter Unit. The Machine is then run at top speed and the tension adjusted by loosening or tightening the Knurled Nuts, Items 17 and 35, until the Tensometer reads 1.5 ozs. (42 grams). If a Tensometer is not available a weight equal to 1.5 ozs. (42 grams) is hung on the wire from the Arm and the tension adjusted as described above until the Supply Reel commences to revolve.

It will now be seen that the Tension Brake Table can be used as a guide for various gauges of wire and the Tension Chart for the winding weights.

The Fixed Tension Adjuster may be used in either of two positions, one in the middle of the Brake Spring and the other directly over the Brake Block, this Adjuster is for use when sufficient tension cannot be applied by the other methods, and if the screw is placed in the middle hole the tension will not be as fierce as if placed directly over the Brake Block.

MAINTAINING THE REEL CARRIER

The Pulley Wheels, Items 10 and 12, should be lubricated with a light grade oil every two to three days, and must be examined from time to time to ensure that they have not suffered damage, as this will affect the covering on the wire.

The Supply Reel Spindle, Item 41, must at all times rotate very freely, thus the Bearing, Item 47, must be lubricated with a light grade oil and dismantled from time to time and cleaned.

The Worm Wheel Bearings, Item 65, and the Worm and Worm Wheel Teeth, Items 65, 66 and 70, must also be lubricated.

On no account must oil or dirt be allowed to collect on the Friction Brake Pulley, Item 55, as this will seriously affect the winding tension.

"DOUGLAS"

R E E L

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"DOUGLAS" FLYER REEL CARRIER

The "DOUGLAS" Flyer Reel Carrier is a take-off stand for use with heavy gauge wire and is illustrated on Plate No. 4. This Reel Carrier has been especially designed for winding coils such as L.T. secondaries, magneto coil primaries, or field or stator coils and can be used with any type of Winding Machine. Wires from 30 s.w.g. (0.0124" — 0.3 mm.) to 14 s.w.g. (0.08" — 0.3 mm.) can be de-reeled.

The Supply Drum sizes must be within the following dimensions :—

Maximum width of Drum ... 7" (178 mm.)

Maximum diameter of Drum ... 13" (330 mm.)

Maximum bore of Drum ... $\frac{3}{4}$ " (19 mm.)

POSITIONING THE REEL CARRIER

It is intended that the Flyer Drum Reel Carrier be secured to the floor behind the Machine within the centre of the total traverse width, but if the winding head of the Machine is fairly high the Carrier must be raised accordingly.

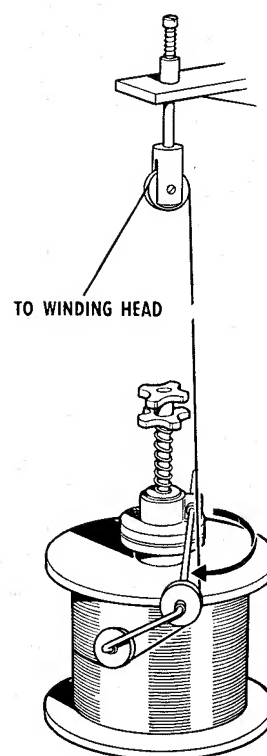
ADJUSTING THE REEL CARRIER

To load the Wire Supply Drum, the Friction Disc Carrier Casting, Item 20, is unscrewed from the Stud, Item 26, this will allow the whole of the Tension Unit and Wire Guide Arm Assembly to be lifted away and the Supply Drum can then be placed over the Stud, care being taken to ensure that the wire rotates in a clockwise direction when de-reeled looking on the top of the Drum. This is important as it has the tendency to tighten the Friction Disc Carrier Casting on the Supply Drum, whereas if placed the other way round this Casting might become loose and lead to serious consequences. The Distance Pieces, Items 21 to 23, must, of course, be added or removed from the Stud to suit the width of the Drum being used, and the Loose Cone, Item 25, replaced on the Stud before loading the Supply Drum.

The Friction Disc Carrier Casting, etc., may now be replaced on the Stud and locked against the Supply Drum with a spanner.

The next step is to adjust the Winding Arm, Item 8. To do this the Screw, Item 27, is loosened and the wire passed around the Pulleys, Item 3, the angle of the Lower Pulley and the distance of the Pulleys away from the rim of the Drum, will depend upon the size of the Drum being used —see accompanying sketch. *Note:* the wrap of the wire around the Pulleys should be sufficient to allow the

wire to remain threaded when the winding is stopped suddenly. The remaining operation is to adjust the Top Friction Disc, Item 15, to give the desired tension according to the wire being de-reeled. To do this the Lower Hand Nut, Item 9, is screwed in a clockwise or anti-clockwise direction and when set is locked by the Upper Hand Nut.



MAINTAINING THE REEL CARRIER

The Ball and Thrust Races, Items 14 and 18, in the Friction Head must be kept lubricated.

The Ball Races in the Winding Arm Pulleys, Item 3 and Pulley, Item 28, must be kept lubricated and from time to time removed and cleaned; this is important as any tendency for these Pulleys to become solid with the Spindle may affect the covering on the wire

"DOUGLAS" LINEAR MEASURE REEL CARRIER

The "DOUGLAS" Linear Measure Reel Carrier has been specially developed to record in yards, feet or metres the amount of material being de-reeled. This Reel Carrier is illustrated on Plate No. 5, which shows the Pre-Set Measure Indicator, etc., and yards or feet and/or yards or metres may be recorded according to the Wire Guide Pulley fitted, see Items Nos. 21 and 22.

The feature of this Reel Carrier is its usefulness when resistance wire is being wound. In addition, there are many uses for such a Reel Carrier in the Textile Industry, but since this Carrier is of recent development and its features in this connection are not fully known, only the de-reeling of wire is dealt with here.

Wires from 47 s.w.g. (0.002 ins.—0.05 mm.) diameter to 28 s.w.g. (0.0148 ins.—0.38 mm.) diameter can be de-reeled and the wire supply reel should be in accordance with British Standards Institute Specification No. 1489, Table 2 (an extract is reproduced on this page). The reason for this is that reels having an excessive gross weight cannot be adequately controlled.

Generally the function of this Reel Carrier is similar to the "DOUGLAS" Standard Reel Carrier, and for the instructions for setting the tension, etc., see Page 9. The only item that needs explaining here is the Measure Indicator.

THE PRE-SET MEASURE INDICATOR

The Pre-Set Measure Indicator fitted to the "DOUGLAS" Linear Measure Reel Carrier is

complete with electrical contacts, Items Nos. 43 and 44, and provision is made via the flexible coupling tube, Item No. 30, to connect the Reel Carrier electrically to the clutch or similar operating mechanism of the Coil Winding Machine. Care should be taken not to make connection to the motor circuit as this would allow overrun of the Machine and an erroneous length of wire would result.

The setting of the Measure Indicator is made by positioning the Barrel Indicator, Item No. 11, and the Pointer, Item No. 33.

For example:—Assuming 1,650 yards of wire are required to be de-reeled. The wire is first drawn from the Supply Reel and passed over the large Wire Guide Pulley, Item 21 or Item 22 as fitted, and down to the former. The Barrel Indicator is then turned until 1,600 shows in the aperture of the Indicator Cowl, Item II and the Pointer is set at 50 on the Calibrated Dial, Item 35; this automatically opens the electrical contacts. Winding may now be commenced and when the pre-determined length is reached, the contacts close.

Up to 2,000 yards, feet or metres can be recorded.

WIRE SUPPLY REEL SIZES

DIAMETER OF WIRE			REEL FLANGE DIAMETER		DIAMETER OF WIRE			REEL FLANGE DIAMETER	
INCHES	METRIC mm.	S.W.G.	INS.	METRIC mm.	INCHES	METRIC mm.	S.W.G.	INS.	METRIC mm.
0.001	0.025	50	1 3/4"	44.45	0.010	0.254	33	3 3/4"	95.25
0.0012	0.03	49	1 3/4"	44.45	0.0108	0.256	32	3 3/4"	95.25
0.0016	0.04	48	1 3/4"	44.45	0.0116	0.280	31	3 3/4"	95.25
0.0020	0.05	47	2 1/8"	53.97	0.0124	0.306	30	4 1/2"	114.3
0.0024	0.06	46	2 1/8"	53.97	0.0136	0.331	29	4 1/2"	114.3
0.0028	0.07	45	2 1/2"	63.5	0.0148	0.358	28	4 1/2"	114.3
0.0032	0.081	44	2 1/2"	63.5	0.0164	0.407	27	4 1/2"	114.3
0.0036	0.098	43	2 1/2"	63.5	0.0180	0.457	26	4 1/2"	114.3
0.0040	0.102	42	2 1/2"	63.5	0.020	0.508	25	4 1/2"	114.3
0.0044	0.114	41	3"	76.2	0.022	0.559	24	4 1/2"	114.3
0.0048	0.122	40	3"	76.2	0.024	0.610	23	4 1/2"	114.3
0.0052	0.132	39	3"	76.2	0.028	0.711	22	6"	152.4
0.0060	0.152	38	3 3/4"	95.25	0.032	0.813	21	6"	152.4
0.0068	0.172	37	3 3/4"	95.25	0.036	0.914	20	6"	152.4
0.0076	0.194	36	3 3/4"	95.25	0.040	1.016	19	6"	152.4
0.0084	0.213	35	3 3/4"	95.25	0.048	1.219	18	6"	152.4
0.0092	0.234	34	3 3/4"	95.25					

Part of the above Table is reproduced by permission of THE BRITISH STANDARDS INSTITUTION, B.S. Specification 1489 (Table 2).

"DOUGLAS" GENERAL PURPOSE REEL CARRIER

TENSION CHART—*Inches*

<i>Light Spring</i>			<i>Heavy Spring</i>		
GAUGE	WINDING WEIGHT	INDEX	GAUGE	WINDING WEIGHT	INDEX
47 s.w.g.	1 oz.	4	36 s.w.g.	9 ozs.	50
46 "	1½ ozs.	6	35 "	10 "	60
45 "	2 "	17	34 "	11½ "	70
44 "	2½ "	25	33 "	13 "	80
43 "	3 "	35	32 "	14 "	90
42 "	3½ "	45	31 "	15 "	100
41 "	4 "	55	30 "	16 "	110
40 "	5 "	75	29 "	18 "	120
39 "	5½ "	85			
38 "	6½ "	100			
37 "	8 "	120			

TENSION CHART—*Metric*

<i>Light Spring</i>			<i>Heavy Spring</i>		
GAUGE	WINDING WEIGHT	INDEX	GAUGE	WINDING WEIGHT	INDEX
0.05	28 grams	4	0.19	255 grams	50
0.06	42 "	6	0.21	283 "	60
0.07	56 "	17	0.23	326 "	70
0.08	70 "	25	0.25	369 "	80
0.09	85 "	35	0.27	397 "	90
0.10	100 "	45	0.29	425 "	100
0.11	113 "	55	0.32	454 "	110
0.12	142 "	75	0.35	510 "	120
0.13	156 "	85			
0.15	184 "	100			
0.17	227 "	120			

NOTE.—The winding weights shown in the tables are those specified by certain wire manufacturers and may have to be exceeded to obtain tight wound coils. The Index figures refer to those marked on the Reel Carrier Dials and should be used only as a guide, that is the Reel Carrier is set to the figures in the tables and finally adjusted as described in the text.

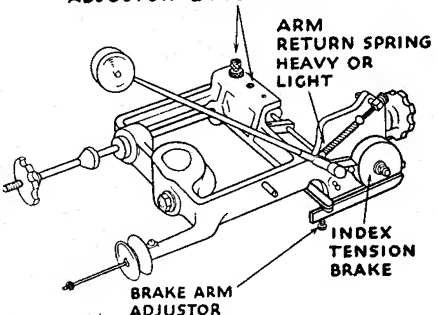
"D O U G L A S" R E E L C A R R I E R S

"DOUGLAS" GENERAL PURPOSE REEL CARRIER

TENSION BRAKE TABLE					
SHAPE OF COIL FORMER	GAUGE OF WIRE	ARM RETURN SPRING	BRAKE ARM SPRING	INDEX TENSION BRAKE	FIXED TENSION
ROUND	47-37 (0.05)-(0.17)	LIGHT	OFF	SEE CHART	OFF
SQUARE OR RECTANGULAR	47-44 (0.05)-(0.08)	LIGHT	APPLIED TO SUIT	OFF	OFF
SQUARE OR RECTANGULAR	43-40 (0.09)-(0.12)	HEAVY	APPLIED TO SUIT	OFF	OFF
SQUARE OR RECTANGULAR	41-37 (0.11)-(0.17)	HEAVY	APPLIED TO SUIT	APPLIED TO SUIT LESS THAN CHART	OFF
ROUND	36-29 (0.19)-(0.35)	HEAVY	OFF	SEE CHART	OFF
SQUARE OR RECTANGULAR	36-29 (0.19)-(0.35)	HEAVY	APPLIED TO SUIT	APPLIED TO SUIT LESS THAN CHART	OFF
ROUND, SQUARE OR RECTANGULAR	28-26 (0.37)-(0.45)	HEAVY	OFF	APPLIED TO SUIT	APPLIED TO SUIT IN EITHER POSITION

NOTE.—The above table shows how the various tension adjustments may be used on the reel carrier. No hard and fast rules can be laid down as conditions vary with different makes of wire and coverings and the manner of spooling on the supply reels.

BRAKE SITUATIONS
FIXED TENSION ADJUSTOR - 2 POSITIONS



The diagram illustrates the mechanical components of the brake system. It shows a side view of the reel carrier with labels pointing to the 'BRAKE ARM ADJUSTOR' (a screw mechanism), the 'ARM RETURN SPRING' (a coiled spring), and the 'INDEX TENSION BRAKE' (a lever mechanism). A note indicates the spring can be set 'HEAVY OR LIGHT'.

“ D O U G L A S ” R E E L C A R R I E R S

UNIVERSAL REEL CARRIER—TENSION CHART

GAUGE OF WIRE	WINDING WEIGHT	DIAL INDEX	TYPE OF ARM	GAUGE OF WIRE	WINDING WEIGHT	DIAL INDEX	ARM INDEX	TYPE OF ARM
50 (0.025)		2	} <i>Light Tension Arm</i>	32 (0.274)	14 ozs.	60	1	} <i>Heavy Tension Arm</i>
49 (0.03)		2.5		31 (0.294)	15 „	60	2	
48 (0.04)		4		30 (0.315)	16 „	60	3	
47 (0.05)	1 oz.	4	} <i>Medium Tension Arm</i>	29 (0.345)	18 „	60	4	
46 (0.061)	1½ ozs.	6		28 (0.375)	20 „	60	5	
45 (0.071)	2 „	8		27 (0.416)	23 „	60	6	
44 (0.081)	2½ „	10		26 (0.457)	25 „	60	7	
43 (0.091)	3 „	13		25 (0.508)	28 „	60	8	
42 (0.101)	3½ „	18		24 (0.558)	31 „	60	9	
41 (0.111)	4 „	25		23 (0.609)	35 „	60	10	
40 (0.121)	5 „	35		22 (0.711)	39 „	60	11	
39 (0.132)	5½ „	42		21 (0.812)	44 „	60	12	
38 (0.152)	6½ „	60						
37 (0.172)	8 „	75						
36 (0.193)	9 „	85						
35 (0.213)	10 „	95						
34 (0.233)	11½ „	110						
33 (0.254)	13 „	120						

Dimensions between () are millimetres.

NOTE.—The Arm Index refers to the setting of the spring, Item 60, on the spindle, Item 59, see Plate 3.

The winding weights shown in the Table are those specified by certain wire manufacturers and may have to be adjusted accordingly.

Plate 1—Parts List

ITEM NO.	DESCRIPTION	PART NO.	NO. OFF	ITEM NO.	DESCRIPTION	PART NO.	NO. OFF
1	Base and Tube Assembly	20283/A	1	23	Bottom Brake Shoe Assembly including Leather	20277/A	1
2	Complete Reel Carrier Assembly	50032/A		24	Leather for Bottom Brake Shoe	11749/1	1
3	Main Casting Assembly including Pt 40146-2, 20273-2 & 2OFF AS46	20279/A	1	25	Return Spring for Pulley Arm	11756/1	1
4	Pulley and Arm Assembly including Ball Race, etc.	13967/A	1	26	Adjusting Stud for Item 25	11755/1	1
5	Main Spindle and Cone Assembly	20278/A	1	27	Brake Drum	11743/1	1
6	Loose Cone	11745/1	1	28	Grub Screw Securing Item 27	AS.28	1
7	Quick Release Nut	11746/2	1	29	Upper Brake Spring and Leather Assembly	11766/A	1
8	Stop Collar	11760/2	1	30	Backing Strip	11752/1	1
9	Grub Screw Securing Item 8	AS.23	1	31	Screw Securing Items 29 and 30	S.221	1
10	Clamping Block for Pulley Arm	11763/2	1	32	Washer	W.1	1
11	Set Screw for locking Clamping Block	S.117	1	33	Collar Securing Item 23	11748/2	1
12	Screw Securing Pulley Arm	S.413	1	34	Grub Screw Securing Item 33	AS.23	1
13	Ball Races for Main Spindle	BR.5	2	35	Spindle for Lower Brake Shoe	11747/1	1
14	Dust Covers for Ball Races	11776/2	2	36	Leather for Upper Brake Shoe	11750/1	1
15	Cam Spindle	11764/2	1	37	Adjusting Nut for Lower Brake Shoe Spring	11557/2	1
16	Collar and Spring Post Assembly	11765/A	1	38	Knurled Lock Nut	11754/2	1
17	Grub Screw Securing Item 16	AS.23	1	39	Adjusting Screw for Upper Brake Shoe	11753/2	1
18	Collar	11768/2	1	40	Spring for Lower Brake Shoe	11757/1	1
19	Grub Screw Securing Item 18	AS.23	1	41	Knurled Nut for Item 25	11473/2	1
20	Cam	11758/2	1	42	Pulley Arm	20276/1	1
21	Cam Adjusting Screw	S.234	1	43	Circlip	11777/1	2
22	Lock Nut for Cam Adjusting Screw	N.22	1	44	Ball Race for Pulley	BR.4	1
				45	Pulley	20282/2	1
				46	Dust Cover for Ball Race	11775/2	1

“DOUGLAS” STANDARD REEL CARRIER PLATE 1.

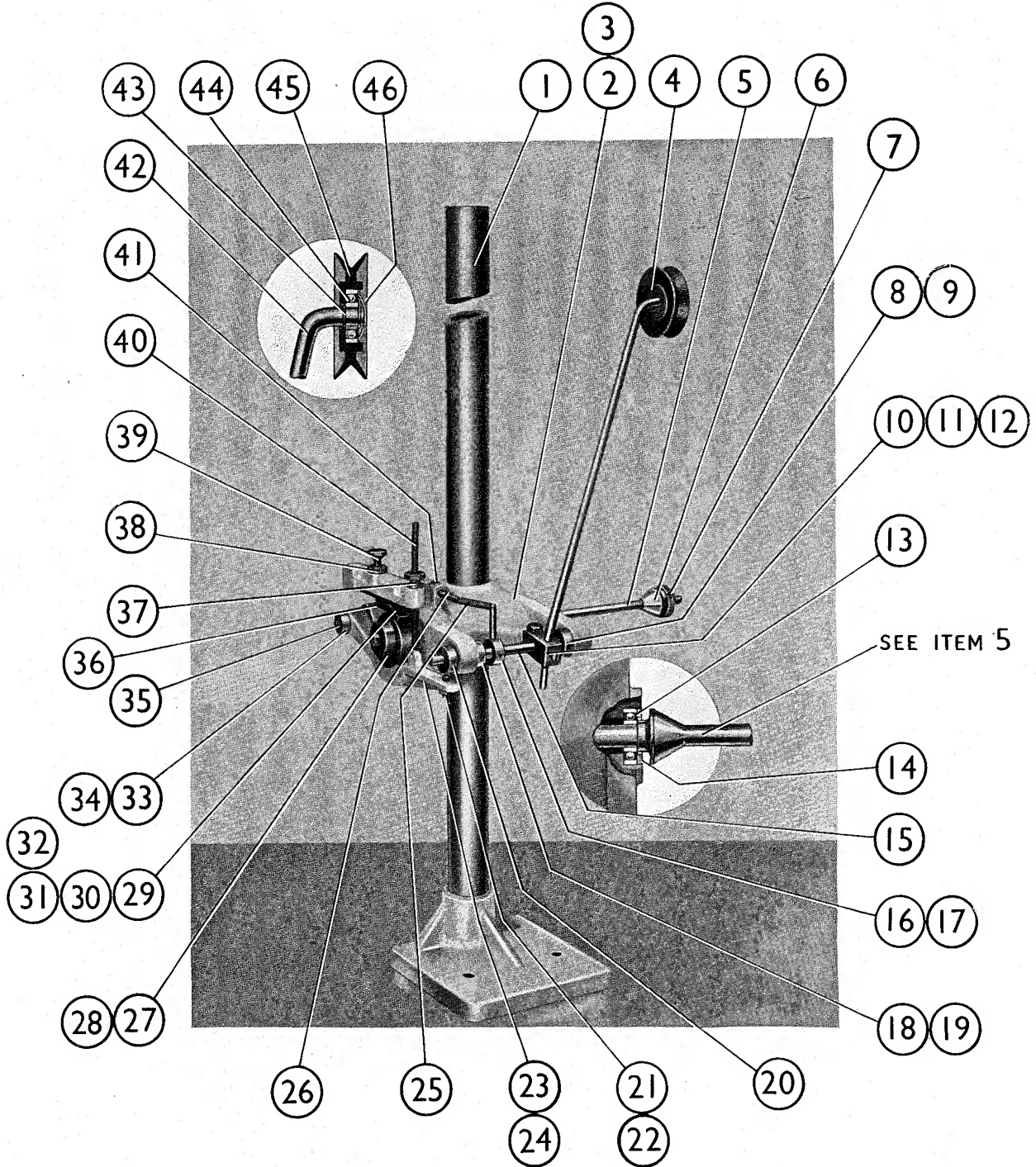


Plate 2—Parts List

ITEM NO.	DESCRIPTION	PART NO.	NO. OFF	ITEM NO.	DESCRIPTION	PART NO.	NO. OFF
1	Complete Reel Carrier Assembly	50085/A	1	35	Screws Securing Item 34	AS.5	2
2	Base, Tube and Column Head Assembly, comprising Pt. No. 20527/2, 20751/2, 40246/2, 40245/2 S.11 and 20339/42	20748/A	1	36	Dowels for Item 34	20245/20	4
3	Column Head	20527/3	1	37	Base	40245/2	1
4	Pin Securing Column Head	20339/42	1	38	Reset Spring	11403/1	1
5	Screw Positioning Column Head	AS.51	1	39	Spring Barrel and Arm Assembly	13646/B	1
6	Slider Tension Screws	BSF.3	2	40	Headstock	40246/2	1
7	Tension Plate and Pulley Bracket Assembly	13645/A	1	41	Brake Block and Pad Assembly	14201/A	1
8	Slider Pulley and Bush	13643/A	1	42	Brake Pad	13630/1	1
9	Collar for Slider Pulley	13623/2	1	43	Screw Securing Item 41	13600/2	1
10	Grub Screw for Collar Item 9	S.811	1	44	Thrust Rod	13626/2	1
11	Screws Anchoring Slider Wires	AS.5	2	45	Roller for Thrust Rod	13627/2	1
12	Washers for Screws Item 11	W.16	2	46	Lock Nut for Item 44	N.20	1
13	Slider Assembly	13644/A	1	47	Anchor Post for Spring Item 48	13597/2	1
14	Slider Pulley Spindle	13622/2	1	48	Spring	11928/1	1
15	Column Tube	20751/2	1	49	Fulcrum Lever Assembly	13640/A	1
16	Ball Race for Main Spindle	BR.5	2	50	Spindle for Fulcrum Lever Assembly, Item 49	13602/1	1
17	Dust Cover for Ball Race Item 16	13632/2	1	51	Screw Securing Fulcrum Lever Assembly, Item 49	13603/2	1
18	Special Lock Nut for Main Spindle	10621/1	1	52	Screw Securing Wire Guide Arm	S.221	1
19	Standard Lock Nut	N.31	1	53	Heavy Tension Arm Assembly	20750/A	1
20	Pillars for Cover	13588/2	2	54	Ball Race for Item 53	BR.3	1
21	Screws Securing Pillar Item 20	S.47	2	55	Medium Tension Arm Assembly	13652/A	1
22	Bracket for Spring Tension Unit	13586/2	1	56	Light Tension Arm Assembly	13642/A	1
23	Screws Securing Bracket Item 22	S.448	4	57	Anchor for Slider Guide Wire	13619/2	1
24	Worm Wheel	11410/1	1	58	Cover for Spring Tension Unit	20749/A	1
25	Pin Securing Worm Wheel Item 24	R.27	1	59	Spindle for Heavy Tension Arm Spring	13604/2	1
26	Column Spring	13003/1	1	60	Spring for Heavy Tension Arm	11918/1	1
27	Hand Wheel Assembly	13608/A	1	61	Tension Index Drum	13583/2	1
28	Pin Securing Hand Wheel, Item 27	R.27	1	62	Screw Securing Item 61	11409/2	1
29	Anchor Rod for Column Spring, Item 26	13601/1	1	63	Roller for Item 39	13629/1	1
30	Plug	13628/1	1	64	Screw Securing Roller	13592/2	1
31	Screw Securing Item 30	S.233	1	65	Brake Carrier Plate	13598/2	1
32	Spring Barrel Arbor	13593/2	1	66	Screws Securing Item 65	AS.5	2
33	Worm	11411/2	1	67	Spindle and Brake Drum Assembly	20664/A	1
34	Worm Carrier Bracket	13594/2	2	68	Slider Stops	13620/2	2
				69	Screws Securing Slider Stops Item 68	S.838	2
				72	Slider Guide Wire	SW.5	1
				73	Tension Cord Pulley	13585/2	1
				74	Spindle for Item 71	13616/1	1
				75	Tension Cord	MISC.37 30 ins	

“DOUGLAS” UNIVERSAL REEL CARRIER

PLATE 2.

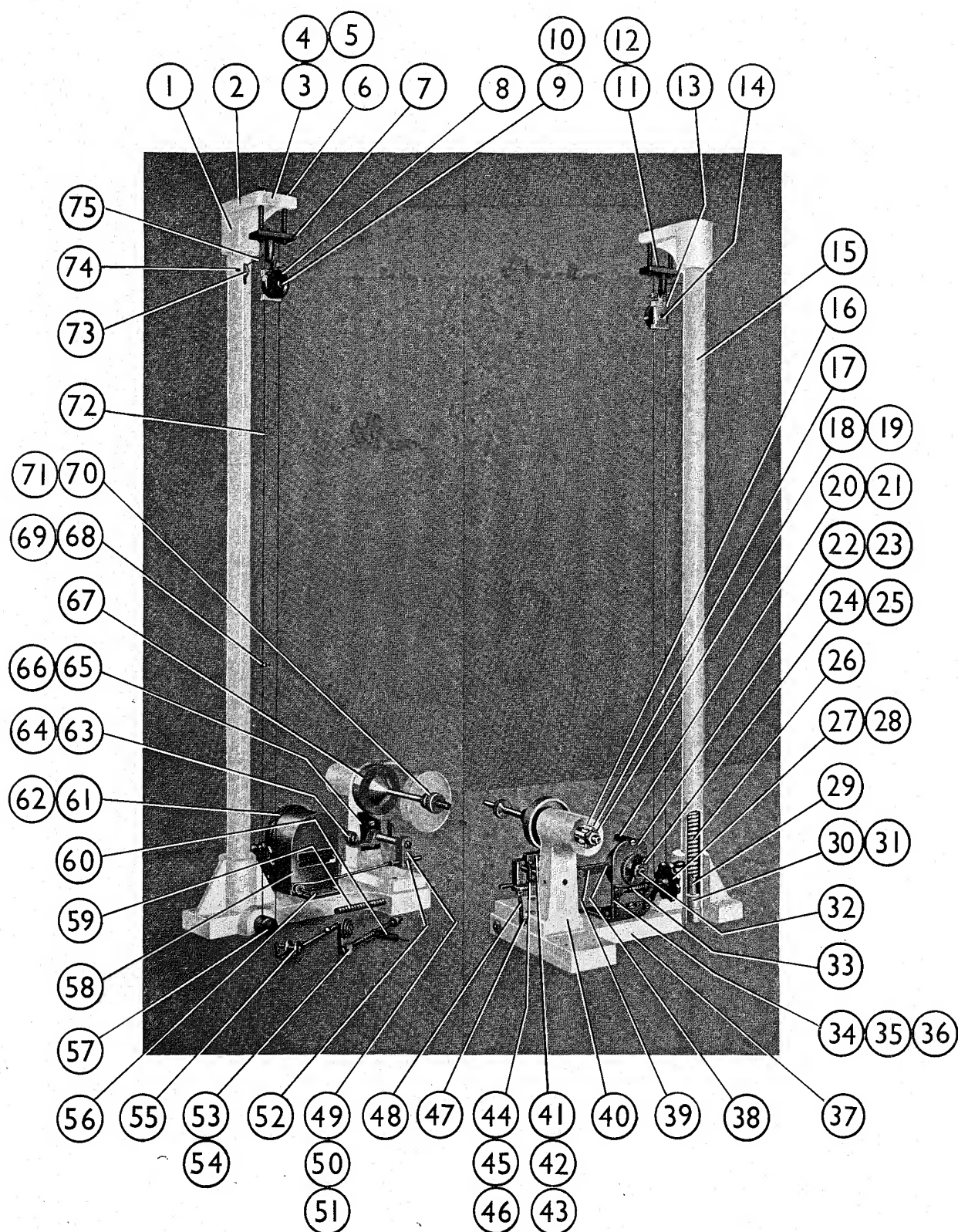


Plate 3—Parts List

ITEM NO.	DESCRIPTION	PART NO.	*A	*B	ITEM NO.	DESCRIPTION	PART NO.	*A	*B
1	Indicator for Dial . . .	11406/2	1	1	35	Knurled Nut . . .	12706/2	1	1
2	Screws Securing Indicator	S.636	2	2	36	Stop Pin	12233/2	1	1
3	Frame for Reel Carrier R.H.	50037/3	1	-	37	Washer	W.23	1	1
4	Frame for Reel Carrier L.H.	50037/4	-	1	38	Nut Securing Cotter Pin	N.30	1	1
5	Pulley Arm and Shaft Assembly R.H.	20336/D	1	-	39	Cotter Pin	11399/2	1	1
6	Pulley Arm and Shaft Assembly L.H.	20336/C	-	1	40	Pulley Spindle	11397/2	1	1
7	Adjusting Screw for Brake Block Assembly	12225/2	1	1	41	Spindle for Supply Reel	14029/1	1	1
8	Locknut for Adjusting Screw	11754/4	1	1	42	Hand Wheel	14028/1	1	1
9	Support Tube Assembly	20335/A	1	1	43	Adjustable Cone	11075/2	1	1
10	Pulley Wheel for Pulley Arm Assembly	10835/3	1	1	44	Screw Securing Adjustable Cone	13470/1	1	1
11	Twicklip	11579/3	2	2	45	Collar	11078/2	1	1
12	Pulley Wheel for Lower Pulley Spindle	10835/3	1	1	46	Screw Securing Collar	13470/1	1	1
13	Twicklip for Item 12	11579/3	1	1	47	Ball Race	BR.5	2	2
14	Block for Adjusting Screw	12229/2	1	1	48	Brake Lever, Complete	20701/A	1	1
15	Washer	W.15	1	1	49	Spindle for Brake Lever	11747/2	1	1
16	Nut Securing Adjusting Block	N.40	2	2	50	Pin Securing Spindle	20245/22	1	1
17	Knurled Nut for Adjusting Screw	11557/2	1	1	51	Collar	11748/2	1	1
18	Adjusting Screw	11755/2	1	1	52	Screw Securing Collar	AS.23	1	1
19	Light Extension Spring	13438/1	1	1	53	Brake Pad	11384/1	1	1
20	Heavy Extension Spring	11421/1	1	1	54	Screw Securing Brake Pad	S.806	2	2
21	Anchor Post for Extension Spring	11395/3	1	1	55	Friction Brake Pulley	11743/1	1	1
22	Spring Barrel and Arm Assembly R.H.	20271/B	1	-	56	Screw Securing Friction Brake Pulley	13470/1	1	1
23	Spring Barrel and Arm Assembly L.H.	20271/D	-	1	57	Collar	11748/2	1	1
24	Washer	W.15	1	1	58	Screw Securing Collar	AS.23	1	1
25	Nut Securing Spring Arbor	N.40	2	2	59	Fixed Tension Brake	12214/A	1	1
26	Contact Stop Stud	11460/2	1	1	60	Screw Securing Item 59	S.219	1	1
27	Insulating Bush	11461/1	1	1	61	Reservoir Bush	11658/2	1	1
28	Insulating Washer	30008/13	1	1	62	Hand Wheel	20325/1	1	1
29	Washer	W.15	1	1	63	Brake Release Block	13469/A	1	1
30	Nut Securing Stud	N.41	1	1	64	Pin Securing Brake Release Block	20245/20	1	1
31	Swivel Block	20708/2	1	1	65	Worm Spindle	11411/2	1	1
32	Switch, Single Pole, ON-OFF	11549/1	1	1	66	Worm Carrier Bracket	11412/2	2	2
33	Release Rod for Friction Brake	12707/2	1	1	67	Screw Securing Worm Carrier Bracket	S.469	2	2
34	Spring	12705/2	1	1	68	Special Screw, Fixing Dial	11409/2	1	1
					69	Wire Tension Indicator Dial R.H.	11552/3	1	-
					70	Wire Tension Indicator Dial L.H.	11552/4	-	1
					71	Worm Wheel	11410/1	1	1
					72	Pin Securing Worm Wheel	R.27	1	1
					73	Clock Spring	11403/1	1	1
					74	Spring Arbor	11407/1	1	1

*A: RIGHT HAND.

*B: LEFT HAND.

"DOUGLAS" GENERAL PURPOSE REEL CARRIER

PLATE 3.

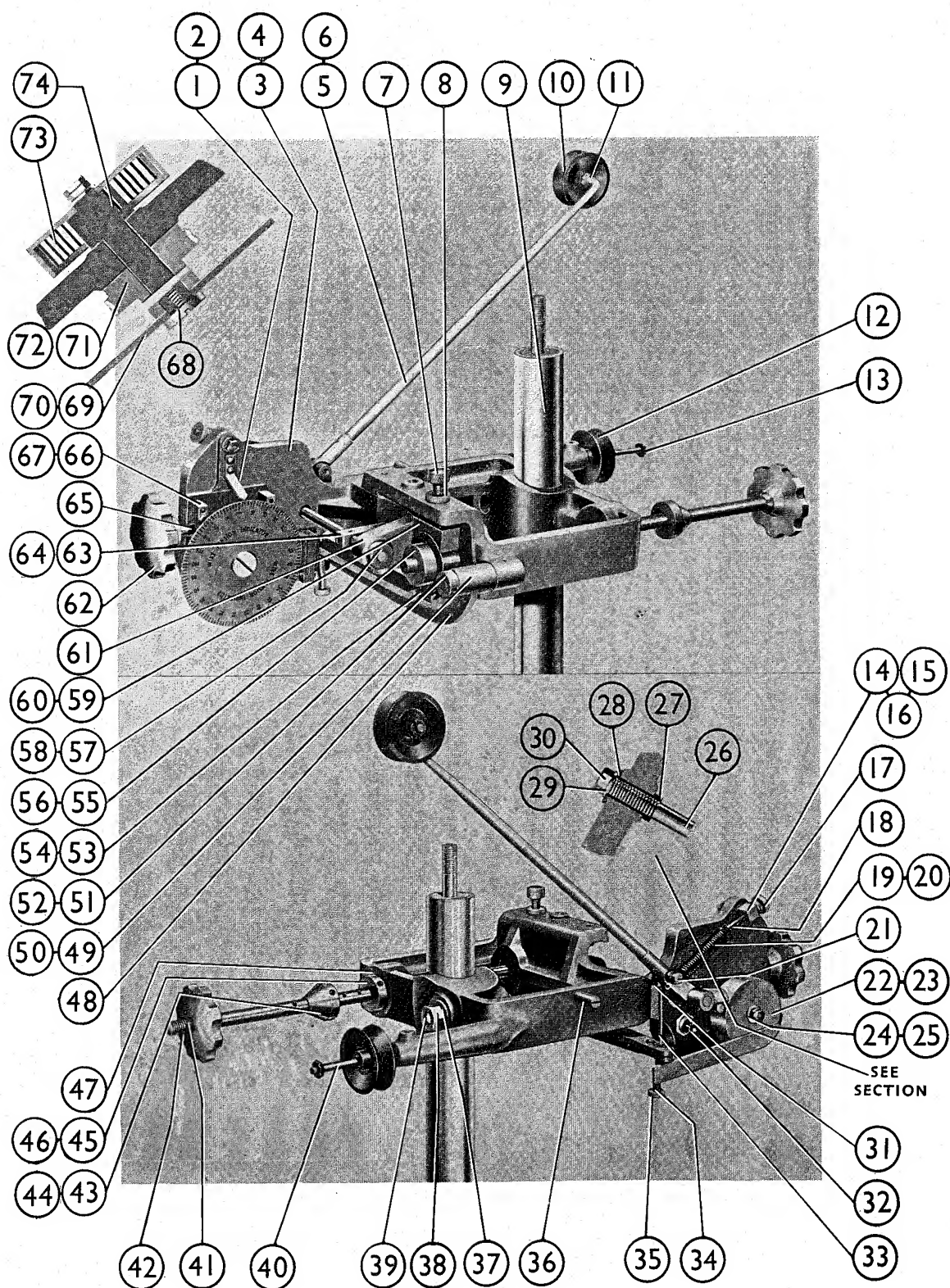


Plate 4—Parts List

ITEM NO.	DESCRIPTION	PART NO.	NO. OFF	ITEM NO.	DESCRIPTION	PART NO.	NO. OFF
1	Complete Reel Carrier Assembly	50004/A		18	Ball Race	BR.1	2
2	Base, Column and Head Assembly comprising Pt. No. 40006/2, 10148/1, 40007/2, and 3 off 20339/33	40416/A	1	19	Dust Cover for Item 18 .	12339/6	1
3	Winding Arm Pulleys .	10706/2	2	20	Friction Disc Carrier Casting	20015/2	1
4	Ball Race Retaining Discs	10151/2	2	21	Distance Piece $\frac{1}{4}$ " thick .	10154/1	1
5	Ball Races	BR.5	2	22	Distance Piece $\frac{1}{2}$ " thick .	10154/2	1
6	Winding Arm Collars .	10239/2	4	23	Distance Piece 1" thick .	10154/3	1
7	Screws Securing Winding Arm Collars, Item 6 . .	S.499	4	24	Lock Nuts	N.32	2
8	Winding Arm.	20016/1	1	25	Loose Cone	10153/1	1
9	Hand Nuts	10143/2	2	26	Stud	10142/2	1
10	Tension Spring	10144/1	1	27	Screw Securing Winding Arm, Item 8	B.S.F.2	1
11	Studs	10142/1	1	28	Pulley	10150/2	1
12	Thrust Washer	10145/2	1	29	Special Screw.	10152/2	1
13	Thrust Race Cover . .	10146/1	1	30	Washer	10238/2	1
14	Thrust Race	BR.15	1	31	Ball Race	BR.5	1
15	Top Friction Disc . . .	20013/2	1	32	Ball Race Retaining Ring	10151/1	1
16	Friction Disc	20014/1	1	33	Spacing Washer for Ball Race, Item 31	10238/1	1
17	Screws Securing Friction Disc, Item 16	S.440	4	34	Bearing Bracket	10141/2	1
				35	Bush	10707/2	1
				36	Top Spring	10709/1	1
				37	Top Stud	10708/2	1
				38	Retaining Cap	10710/2	1

"DOUGLAS" FLYER REEL CARRIER

PLATE 4.

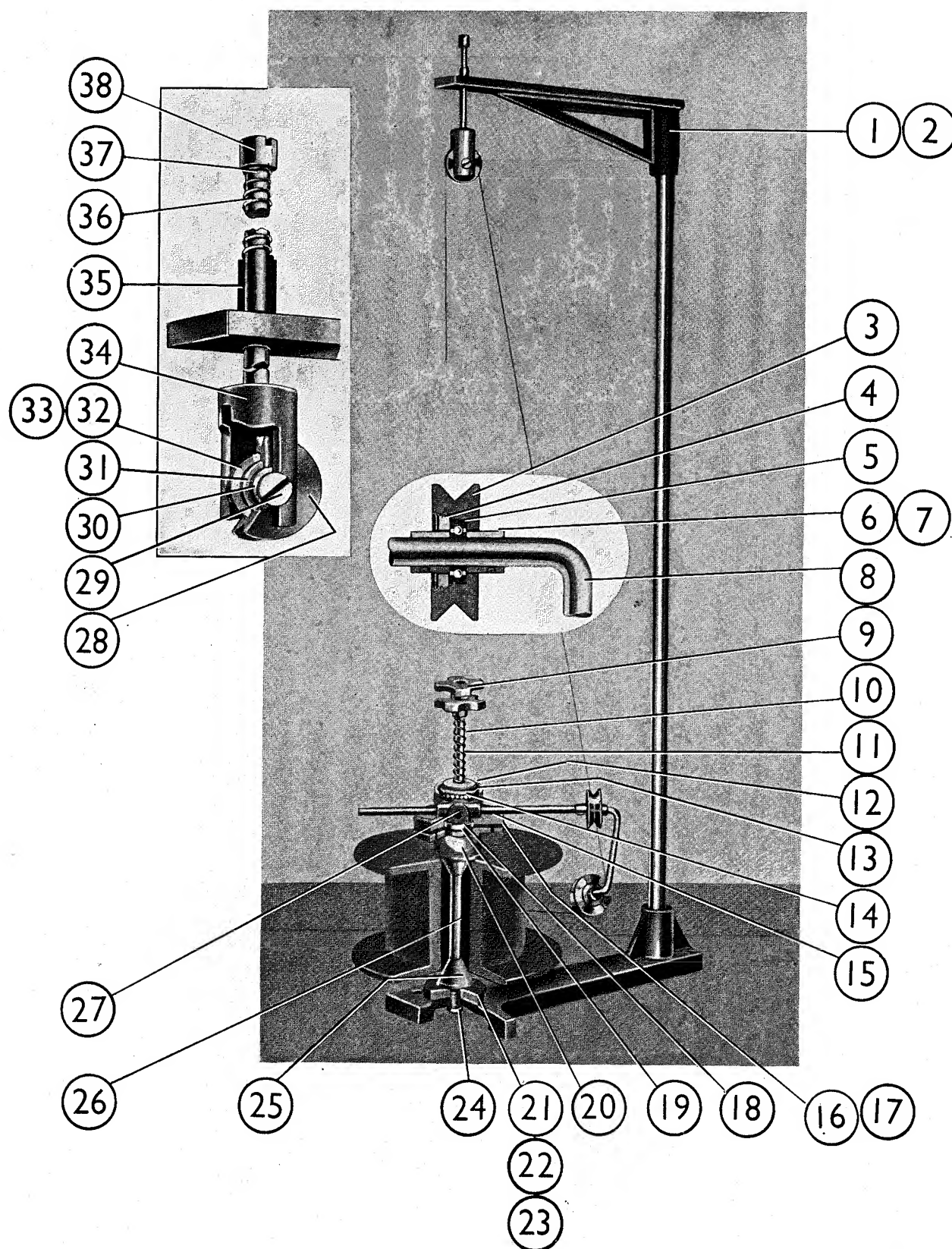


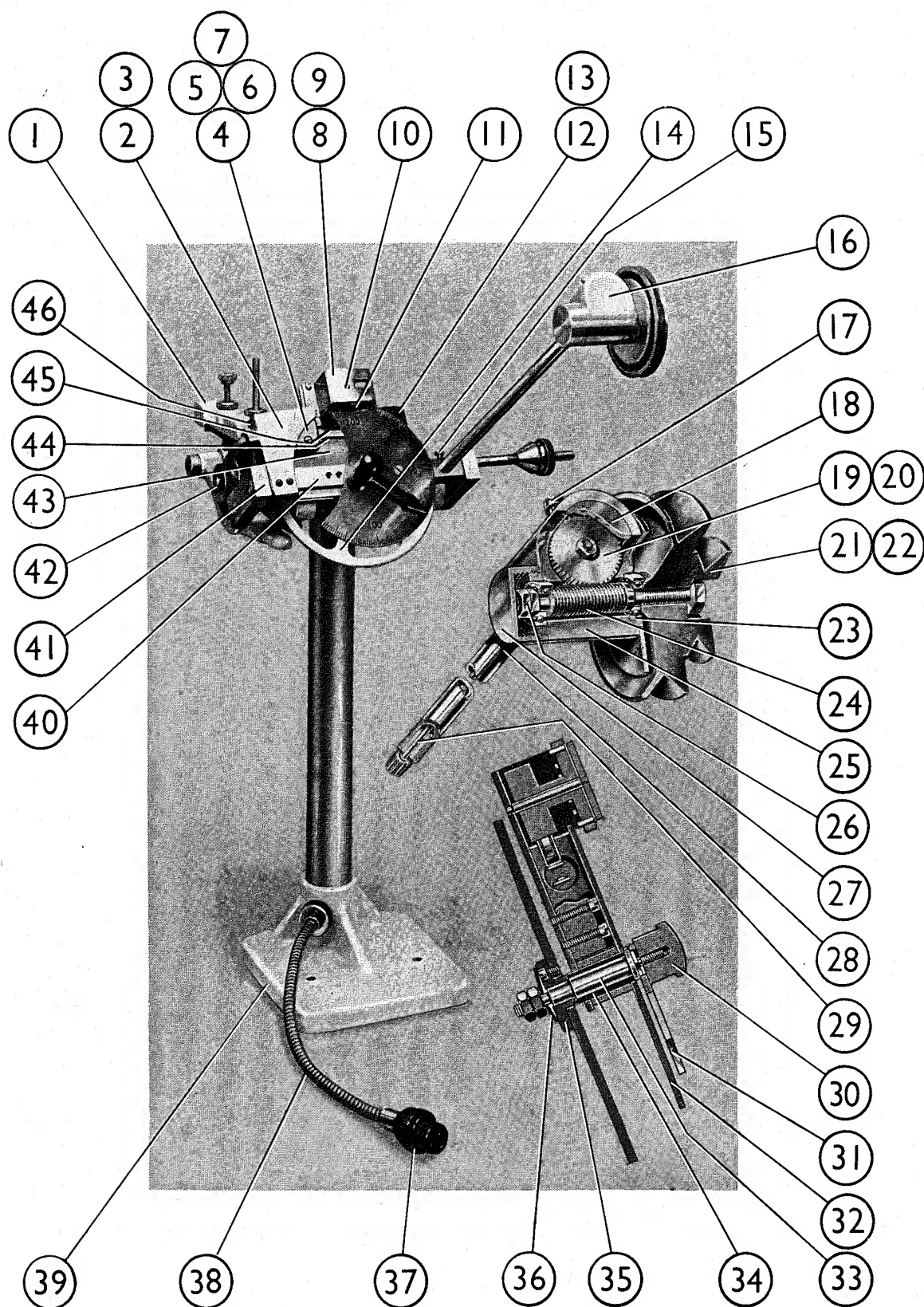
Plate 5 — Parts List

ITEM NO.	DESCRIPTION	PART NO.	QUAN. OFF	ITEM NO.	DESCRIPTION	PART NO.	QUAN. OFF
1	Reel Carrier Complete .	40428/A		25	Worm Case and Flange		
2	Connection Cover . . .	14061/A	1		Assembly	14101/A	1
3	Screw Securing Item 2 .	S.615	2	26	Lock Nuts	N.22	3
4	Contact Fixing Plate . .	14088/2	1	27	Grease Cap	14102/1	1
5	Insulating Plate	14089/1	1	28	Pinion Gear Tube As-		
6	Insulating Block	14087/1	1		sembly	14103/A	1
7	Screws Securing Items 4,			29	Gear Pinion Spindle As-		
	5 and 6	S.669	2		sembly	14106/A	1
8	Indicator Cowl	14090/2	1	30	Pointer Knob	14109/1	1
9	Screw Securing Item 8 .	S.676	4	31	Dial Pointer	14108/2	1
10	Barrel Spindle	14091/1	1	32	Calibrated Dial	11541/1	1
11	Barrel Indicator Assem-			33	Pointer Spindle	14112/1	1
	bly	14092/A	1	34	Pointer Spindle Bush .	14115/1	1
12	Contact Cover Block . .	14095/2	1	35	Gear Wheel Bush	14116/2	1
13	Screw Securing Item 12	S.677	2	36	I.O.M. Washer	12668/1	1
14	Gear Wheel	14096/2	1	37	Socket	12354/1	1
15	Screw Securing Item 16	S.456	1	38	Flexible Coupling Tube		
16	Pulley Arm Assembly . .	20830/A	1		Assembly	20800/A	1
17	Screw Securing Item 25	S.449	1	39	Base and Tube Assembly	40429/A	1
18	Case Disc	14097/1	1	40	Square Mounting Bar . .	14124/1	1
19	Worm Wheel	14098/1	1	41	Distance Pieces	14125/2	2
20	Nut Securing Item 19 .	N.25	1	42	Cam Spindle	11764/2	1
21	Yards/Feet Measure			43	Back Plate	14126/2	1
	Pulley	12618/1	1	44	Fixed Contact Assembly	14117/A	1
22	Metric/Yards Measure			45	Moving Contact Assem-		
	Pulley	14086/1	1		bly	14118/A	1
23	Ball Race	BR.8	2	46	Return Spring for Pulley		
24	Worm Spindle	14100/1	1		Arm	11918/1	1

NOTE : FOR ALL OTHER PARTS NOT SHOWN SEE PLATE 4
 "DOUGLAS" STANDARD REEL CARRIER.

“DOUGLAS” LINEAR MEASURE REEL CARRIER

PLATE 5.



"D O U G L A S" R E E L C A R R I E R S

OTHER MACHINES IN
THE " AVO " RANGE

- " DOUGLAS " NO. 6
- " DOUGLAS " NO. 1
- " DOUGLAS " NO. 3
- " MACADIE " S.C
- " MACADIE " T.D.S.M.
- " DOUGLAS " NO. 15
- " MACADIE " FULLY AUTOMATIC P.I
- " DOUGLAS " H.F.
- " DOUGLAS " NO. 3 EXTENDED BASE
- " DOUGLAS " LARGE MULTI WINDER
- " DOUGLAS " SMALL MULTI WINDER
- " DOUGLAS " DUAL HEAD
- " DOUGLAS " MAGNETO
- " DOUGLAS " SPECIAL EXTENDED BASE NO. 6
- " DOUGLAS " SPIRAL
- " DOUGLAS " WAVE WINDER
- " DOUGLAS " NO. 8 TAPING MACHINE
- " DOUGLAS " HEAVY DUTY POWER DRIVEN
- " DOUGLAS " HEAVY DUTY H.F.
- " DOUGLAS " PROGRESSIVE WAVE WINDER
- " DOUGLAS " ELECTROMAGNETIC COUNTERSHAFT



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